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THE JOURNAL OF PHILOSOPHY

THE NEW RATIONALISM IN ETHICS

HISTORICALLY, rationalism in ethics has been the view that moral judgments and ethical standards may be justified to the reason of man in such a way as to give them a cognitive and hence objective status. From Socrates through Butler and Kant to Dewey this theme has appeared in countless variations. Naturalists and non-naturalists alike have sought in reason a grounding for a non-subjective and autonomous ethics. On the other hand, it is apparent that the dominant naturalist tradition, since Hume, at least, has been to give emphasis to the non-rational elements in moral processes and to subordinate reason to the place (in Hume's language) of "slave to the passions."

Many contemporary ethical naturalists accept this subordination, and what may appear to be its subjectivistic and relativistic implications, with untroubled candor, regarding it as a simple fact of life to which we must adjust both our theory and our practice. Those who take this position may be referred to as "contented naturalists." But there are "discontented naturalists" also, who, disquieted by and restive under a theory that would seem to leave standards at the mercy of human preferences hanker after some way to preserve interpersonally valid principles of right action within a naturalistic framework. And the favorite way hit upon is that of an appeal to reason—but to a conception of reason which interprets it more subtly than as an instrument for applying general rules to special cases. By the "new rationalism" referred to in the title, I have in mind several recent attempts, characteristically similar in kind and in motivation, to accomplish this goal. The purpose of this paper is to assess and, as it will appear, to question the success of these attempts.

By way of stating as precisely as possible the widely accepted doctrine to which these "new rationalists" object and by way also of calling attention to certain critical aspects of the problem involved, I should like to refer briefly to an article by Arthur Pap on "The Verifiability of Value Judgments."[1] The particular contribution of this essay is to display a sense in which so-called "in-

[1] *Ethics*, Vol. LVI (1946), pp. 178–185.

trinsic goods'' are unverifiable that holds quite apart from their status as being ultimate objects of interest. This sense arises out of the logical correlativity of the ideas of intrinsic and instrumental value, a correlativity which Pap suggests is similar to that of axiom and theorem. Just as, he argues, an ''axiom'' that was demonstrable would not, in the system in which it was demonstrable, *be* an axiom, so an intrinsic good or an ''ultimate standard'' must be considered indemonstrable within the context in which it functions as a premise defining value. In such a context an intrinsic good is by definition unverifiable. On the other hand, instrumental goods are in principle always verifiable or justifiable by reference to an intrinsic good, since they are, with an appropriate empirical premise, strictly deducible therefrom. Thus Pap concludes

> Every verifiable judgment of the form ''*x* is good'' is really elliptical for ''*x* is good for *y*,'' i.e., ''*x* is instrumental to *y*, which is, by an axiological rule, agreed to be good.'' [P. 184.]

He points out that the judgment of instrumental value is not to be identified with the purely causal judgment that *x* is a means for *y*, and then goes on to make a remark which I can not help believing represents only an infelicity of formulation on his part, but which is worth attending to because of its significance for the problem we are treating.

> What distinguishes the judgment of instrumental value ''*x* is good, being conducive to *y*'' from the purely causal judgment ''*x* is a means for *y*'' is that it is equivalent to the logical product of the latter judgment *and* the judgment of intrinsic value ''*y* is good.'' [P. 184.]

In the light of his contention about the unverifiability of judgments of intrinsic value, it is hard to see how Pap can mean this. If a judgment of instrumental value is literally a conjunction of a (verifiable) causal judgment and an (unverifiable) judgment of intrinsic value, then the conjunction can hardly be verifiable. To verify *A and B* would surely be impossible if *B* were unverifiable.

Pap's formulation may be attributed to carelessness of statement, but the error is instructive. Take the concept of instrumental value as involving that of intrinsic value, and conceive reason as the manipulation of tables of inference—either ''truth tables'' or ''tables of induction''—and judgments of instrumental value are no more verifiable than those of intrinsic value.

The moral seems to be that, if we accept the *instrumental-intrinsic* dichotomy at all, the crucial problem of verifiability is that of indicating a sense in which assertions of intrinsic value can be justified to reason. A beginning to the attack on the problem may be made by inquiring as to the nature and status of assertions of

intrinsic value. How shall we interpret "*y* is (intrinsically) good"? There appear to be three possible interpretations of this statement consistent with naturalism: (1) it may be a purely emotive utterance; (2) it may be a definition; (3) it may be a synthetic proposition (*a posteriori,* of course).

(1) Its interpretation as an emotive expression would seem to place it or a conjunction of which it was a member beyond the pale of verification—assuming that it makes any sense at all to speak of an expression of emotion as a participating term in a logical product. An emotional utterance is an act, not a claim to truth, and hence not verifiable in any ordinary sense. Sometimes, of course, we do call acts justifiable or reasonable, but this is probably an elliptical way of referring to the reasonableness of the proposition *that* someone should on such and such an occasion perform that act. This would displace interpretation (1) by (3) above: "*y* is good" would be a proposition. And even if an expression of emotion or of approval could properly be called reasonable, it is difficult to see how, being an act and not a principle or a rule, it could itself serve as a *reason* for the performance of more particular actions. Acts may be causes, but hardly reasons.

(2) The interpretation of "*y* is good" that treats it as a definition likewise seems incapable of supporting any doctrine of the reasonableness of ultimate axiological premises. In all strictness, definitions can not sustain propositions or be sustained by them—except, of course, in the case of propositions *about* definitions. Thus, we may be able by rational inductive processes to determine what definitions of value predicates are implicit in the discourse and behavior of certain people and use this information to make inferences about further instances of their discourse and behavior. But the fact remains that such processes, scientific and rational though they be, tell us what the standards or norms of these people are and in no way serve to justify them or give them rational support.

(3) There remains the interpretation of "*y* is good" as a non-analytic proposition asserting something about *y*. What is asserted about *y* must, since it is naturalism we are examining, be a descriptive property. For the purposes of this paper, we may be even more precise than that. We shall say that it is a description in terms of interest and its satisfaction. This restriction is justified to the extent that the rationalist views we are to examine in each case define value in these terms. Accordingly, this third interpretation of "*y* is good" must mean something like "*y* satisfies an interest (or my or your or a group's interest)." As so interpreted,

however, it is plain that the statement is verifiable in the sense of being testable by inductive procedures.

In what sense, then, may such assertions of intrinsic value be said to be unverifiable and incapable of interpersonal validity? Clearly, not when taken as simple propositions, but only when taken as axiological principles affirming the ultimacy of the interest or commitment whose operation the proposition asserts. We have moved from the problem of locating and describing interests to the problem of choosing and adopting them. And the question faced is that of justifying the choice of the principle by which we propose to justify all choices. Any act of choice must be in accord with some interest which, for that chooser at that time, constitutes his principle of choice. But if to be valuable has, in a given context, no meaning other than to be the object of a specified interest, then the proposal to assess the value of *that* interest is not only indefensible but unreasonable and even meaningless.

But this, it may be said, being essentially truistic, who would wish to quarrel with it and why? Now I do not mean to say that anyone would wish to meet it head on. But there are those who would like to circle circumspectly around it, the explanation of this desire lying in the traditional objections with regard to ethical relativism, viz., that if the adoption of interests is ultimately indefensible and irrational, then, given ultimately conflicting interests, resolution of the differences by appeal to reason seems to be ruled out.

On the assumption, however, that it may be well to permit those who are concerned with this problem to define it for themselves, let us turn directly to them, recognizing that a good portion of our time has already been consumed in loading our guns, but trusting that, being "loaded for bear," we can now deal with our quarry with dispatch.

To name the quarry—this is the tale of *three* bears—I have in mind arguments found in three different sources: P. B. Pratt's *Reason in the Art of Living*[2]; W. T. Stace's *The Destiny of Western Man*[3]; and C. I. Lewis's *An Analysis of Knowledge and Valuation*.[4] I do not know which is to be considered the big bear, which the middle-sized, and which the little, but shall simply take them up in the order named.

Pratt begins with the Aristotelian observation that since we are rational beings we ought to act rationally—a proposition which, in the context of the present problem, I am inclined to regard as either

[2] New York, Macmillan, 1949.
[3] New York, Reynal and Hitchcock, 1942.
[4] La Salle, Illinois: Open Court, 1947.

tautological or question-begging. But Pratt gives a special twist to the imperative to be rational by arguing that our *only* justification for an action is that this action is capable of defense before the court of reason. "A good choice," he tells us, "is one that a rational being can justify to other rational beings" (p. 183). "The moral act is the rationally defensible act" (p. 208). More specifically, what makes a choice or act rational is that it is (1) impersonal and unprejudiced and (2) aimed at the greatest value obtainable. Value being defined as "the character possessed by an object, event, or experience in virtue of the fact that some sentient being likes it when he gets it; or would like it if he got it" (p. 175), it is concluded that we act rationally when we act to promote impartially the interests of all individuals touched by our act. In this way, egoism is ruled out as irrational since the egoist fails to take into consideration *all* relevant interests.

There are at least three basic appeals to reason in Pratt's argument, two of which, at least, appear as basic in the views of Lewis and Stace:

(1) The modification of the definition of value from simple liking to critically examined liking.

(2) The identification of rationality with impartiality and lack of prejudice, giving rise to the conclusion that all interests should be treated in the same way, and thus ruling out subjectivism and relativism.

(3) The identification of what is moral with what is rational; the assertion that a rational act necessarily aims at the greatest good available.

The purpose of all these arguments, of course, is to show that a moral choice is a rational one. Even if they proved this, however, it must be held in mind that the obligation to be moral would in any event only be recognized, so far as this argument goes, by those who recognized the obligation to be rational. And since naturalists tend to construe obligation in terms of psychological drives connected with interests and desires, they seem faced at the outset with the question of the circularity of any attempt rationally to justify the interest in being rational.

But assuming the *de facto* existence of an interest in being rational, what may be said of the considerations just listed as demonstrating that such an interest must also be an interest in being moral?

We may first examine the attempt to introduce reason into ethics through the device of defining value as "what we would want if we knew what we wanted" or as "what we would like if we had it."

Certainly to define value in this fashion, rather than in terms of uncriticized wantings and likings, is to interpret value in a way consonant with enlightened common sense. And it does appear to require the agent to be rational in the sense that he must examine any interest with respect to its conditions, concomitants, and consequences—with respect to its *de facto* perduring character and its consonance with other interests. But as supporting the thesis of the rationality of morality, it suffers this obvious flaw: Ultimately that which tests the value of an interest is another interest or set of interests; and if it is held to be irrational to decide a question in terms of a single interest (presumably because an interest *is* an interest and not a "reason"), it is far from apparent why a decision in terms of a multiplicity of interests, no matter how viable or harmonious or fundamental, could be expected to help matters. In other words, interests may indeed be sorted, accepted, and rejected by the use of rational deductive and inductive methods, but, in the end, it is the interests of the sorting agents that prescribe the principle of selection—whether it be harmony, all-inclusiveness, durability, variety, or whatever. So that, although what a man might come to, who preferred to settle his preferences in terms of what in knowledge he preferred to prefer, *could* be the world of impartially consummated human interests, there is no guarantee that it would and there is some evidence that, in certain cases, it wouldn't. This, of course, is an old story which one would hesitate to retell if it were not that there are those who tell part of it and then balk at the conclusion.

Second on the list of appeals to reason which we found in Pratt's argument is the interpretation of rationality as impartiality, leading to the conclusion that in any rationally functioning moral choice *all* relevant interests, no matter whose, should be served. Precisely this thesis, with precisely the same invocatory reference to rationality, appears in the above-mentioned writings of Stace and Lewis.

Now, *prima facie,* this argument rests on a surreptitious and illicit shift from interests taken as the determinants of what is valuable to interests taken as being themselves valuable. But interests and their satisfactions, no more than telegraph poles, are, on the doctrine being examined, ends *per se.* We may indeed *call* an egoist who happens not to be interested in the interests of others in the same measure that he is in his own, an "irrational" person. Certainly he would not be treating others impartially. But since he sees no value in interests as such, he would be very likely to regard the impartial treatment of interests as not at all reasonable.

Stace gives the argument under consideration an interesting turn by contending that all interests and satisfactions are, in point of fact, ends, since every individual invariably prefers his own satisfaction to anything else in the world. This, he claims, gives to every individual the status of an absolute end. "Reason," he says, "forces me to admit that others too have ends which are on the same level and of the same kind as my own. But if *A* and *A'* are in fact identical in kind, it is irrational to treat them as if they were of different kinds. And this is what I do when I treat myself as an end and all others as means. Therefore to live the rational life . . . means to treat all men as having the same infinite value which I inevitably attribute to myself."[5] From this follows the democratic doctrine of the equality of all men.

One is tempted to wonder what a rational Fascist would make of this argument. (To be sure, if the argument is correct, the expression "rational Fascist" is a contradiction-in-terms—Fascists just can't be rational—or they can't have read Stace.) If he were thoroughly rational and thoroughly a Fascist, I imagine he might reply: Granting that all men are alike in that they are in some sense *loci* of value, how is anyone, however committed he may be to treating them as alike in this respect, to know just what treatment is appropriate and relevant to this kind of likeness? Stace contends that the presence in men of similar desires implies that the proper treatment of this mode of likeness is to aim at the maximum satisfaction of those desires. But this certainly involves, in addition to the principle of impartiality—"treat similars as similars"—a special principle indicating how the particular characteristic in respect of which they are similar is to be honored. And surely Stace's special principle that the existence of individuals with interests carries the corollary of the appropriateness of serving their interests is a principle of individualism that no Fascist would accept. It would appear, then, that there is nothing in Stace's argument to suggest that reason, as impartiality, can serve as a sufficient substitute for, say, a good will.

The dictum that all interests ought to be served, implicit in Stace, is explicit in Pratt, who, as we have seen, gives it the blessing of reason. Unfortunately his readers are not blessed, so far as I can discover, with any specific account of how he would, in terms of reason alone, defend the dictum. Lewis, on the other hand, does weave together an argument about the reasonableness of seeking what is valuable, which is of sufficient suggestiveness to warrant discussion.

[5] *Op. cit.*, p. 144.

"Whatever is justly valued," he says, "calls to be realized or maintained, and holds some imperative for conduct."[6] "Acting so that the valuable may be realized is the very essence of what it means to be sensible or reasonable."[7]

As it happens, these remarks occur in contexts which suggest that Lewis is asserting the reasonableness of universally valid moral imperatives. However, other passages seem to show that the values which the rational man is "called" to promote are by no means unrestricted in the sense which Pratt's formulation of the principle requires. "Action," Lewis writes, "is always for the sake of realizing something to which positive value is ascribed" (p. 366). Because present action may be a matter of later regret, action is "subject to imperatives." Life, if we take it seriously, and not perversely, presents the categorical imperative, "Be consistent . . .; be concerned about yourself in future and on the whole" (p. 481). "The basis of this imperative is a datum of human nature" (p. 482). "It requires no reason; being itself the expression of that which is the root of all reason" (p. 481).

I think it is clear that the notion of rationality has here received an extension in meaning beyond that of inference or logical correctness. This Lewis is quite prepared to admit and it is therefore no objection to his thesis as such, but it does, in a sense, give us a form of rationalism which, far from being contrasted with interests and purposes, is rooted in them.

However, if we accept a definition of the rational as the sensible, nearly everyone would agree that the "sensible" person is the person who conducts his life according to a plan which he will be "permanently best satisfied to have adopted" (p. 548). And such a plan need not, of course, be an egoistic one. But the chances are that if the plan adopted *were* egoistic, few of those who accepted Lewis's definition of "sensible" would be inclined to withdraw this tag so long as the egoistic plan gave promise of promoting the value economy of the agent. Yet I think there is no doubt that Lewis would like to make "sensible" apply in a peculiarly moral way to just those choices that take equal account of *all* relevant value experiences in an impersonal fashion. Unfortunately the desire to extend the application of "sensible" and "rational" beyond the sphere of first-personal concerns receives no clear implementation in *An Analysis of Knowledge and Valuation*.

One final question about Lewis's version of the Kantian imperative: Can an imperative to act consistently be expected to provide something more than a negative moral directive because it happens

[6] *Op. cit.*, p. 439.
[7] *Ibid.*, p. 413.

to be based on a naturalistic foundation of interests rather than a transcendental foundation of reason? To be sure, interests that are not consistent are not effectively actualizable. But the Devil cares for consistency and reason as much as does the man of good will. What is called for is a principle by which to sort out the better from the worse among sets of interests all of which may be internally consistent, and this principle bare reason fails to provide.

What may we conclude from this brief survey of current forms of ethical rationalism? Certainly nothing so general as that, in Hocking's words, "no rational enthusiasms are possible." But we may well conclude that those who, in the structure of their axiology, are followers of Hume, will be hard put to it, within that structure, to derive from such conceptions of reason as were examined in this paper any universally valid principles of conduct. For we pay no tribute to reason, but only to wishful thinking, when we attempt to distill out of reason significances which are no part of its nature.

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KANTIAN DIALECTIC AND MODERN SCIENTIFIC COSMOLOGY

COSMOLOGY is commonly characterized as that discipline which seeks to determine the properties of the universe as a whole when considered as a physical system. Ever since the days of Kant, at least, the conviction has persisted in many quarters that any attempt at obtaining positive knowledge of this scope is doomed to failure. One of the principal achievements of the *Critique of Pure Reason,* it is thought, is to have shown the inevitable antinomies into which the human intellect falls when it undertakes to arrive at or uphold definite conclusions in this domain. Confronting this opinion, however, we find a recent scientific recrudescence of interest in cosmological problems that is at once impressive and challenging. Roughly since the second decade of the present century, a variety of advances have been made both on an observational and a theoretical level which seem to have won a measure of success in increasing our insight into the properties of the universe as a whole. Hereupon a number of obvious questions suggest themselves: Are the Kantian strictures against cosmology in any way effective against contemporary scientific efforts? How sound are Kant's own conceptions of the problems, methods, and goals of cosmology? In what way does scientific cosmology promise success in its treatment of the universe as a *totality?* How does it avoid, if at all, the Kantian charge that any attempt at dealing with this problem means

to take on something that is transcendent to experience? It is the purpose of the following pages to try to offer some clarification of these issues.

I shall argue that the manner in which Kant formulated the problems of cosmology, their content and alleged limitations, as well as his own "critical" solution to them, suffers from certain decisive defects. Due to their presence, his analysis offers no serious challenge to the promise of fruitful scientific activity in this area. On the contrary, the particular features that characterize contemporary scientific approaches to the problem (and for that matter many of those in the past that for all their relative primitiveness and errors were nevertheless scientific in character) exhibit the kind of significant procedures and goals that are nowhere recognized by Kant and were not in fact present either in the views he criticizes negatively or in his own critical solution.

The situation here is analogous in some respects to that which occurred in connection with Kant's views on mathematics. His conception of space, for example, as at once a form of sensibility and as necessarily Euclidean in character served only to hamper the appreciation of the true status of geometry. The progress of that science since the nineteenth century, the recognition of its formal character, the significance of the newly discovered non-Euclidean geometries, all served finally to relegate Kantian views to the limbo of discarded philosophies. Creative mathematics and the truly critical philosophy that accompanied it in its growth, refused to be blocked in its progress by being set into an arbitrary and supposedly eternal mold by Kant's thought. Just in the same way, we venture to think, Kant's whole approach to cosmology will reveal itself as but a lame and trifling deterrent to the kind of advances of which a scientific approach is capable.

Of the discussions of antinomies in cosmology in the *Critique of Pure Reason,* only the first, that which deals with the space-time features of the universe as a whole, is relevant to our present purpose. The others, which treat of the problems of the divisibility of matter, causality, and the existence of a necessary Being, are beyond the range of interests of contemporary scientific cosmology and do not offer an opportunity for fruitful comparison.

Kant's treatment of the problems of cosmology is dominated at once by his adoption of the Newtonian conception of space and time as absolute and by the incorporation of this conception within the framework of his own distinctive epistemology. One is tempted to say that whatever is defective in Kant's approach stems from the fusion of these two elements: abstracting, dislocating, and embalming a particular conception of space and time as this functioned in

the elaboration of a physical theory at an important stage in the development of science and making of it an *a priori* pattern, now psychological, now methodological, into which all description and explanation of physical processes must be fitted.

It is important, too, to remember that Kant's treatment of cosmological issues is dominated by his adoption of both Newtonian ideas and the principles of his own transcendental idealistic epistemology, not simply in the positive critical solution he offers to the first antinomy, but even in the very formulation of the thesis and antithesis from which he seeks escape. For the manner in which all of these are treated reveals that they already embody certain crucial characteristics of Kant's own distinctive point of view. Among other things, therefore, we can easily anticipate as a result of this situation that it would not at all logically follow that a rejection of Kant's transcendental solution would have the effect of forcing one back into either of the positions he considers and rejects. The alternatives he poses, the dialectical embarrassment he depicts, become just as spurious as his own proposals for escape.

How, as a matter of fact, Kant alternates sometimes within the course of a single argument from a realistic mode of language in which the Newtonian conception of space and time as absolute continua dominates the background to an epistemological treatment of a peculiarly psychological and subjectivistic character, is well illustrated in the statement of the thesis of the first antinomy. In the first part of the argument, that which relates to the temporal duration of the world, Kant writes:

> If we assume that the world has no beginning in time, then up to every given moment an eternity has elapsed, and there has passed away in the world an infinite series of successive states of things. Now the infinity of a series consists in the fact that it can never be completed through successive synthesis. It thus follows that it is impossible for an infinite world-series to have passed away, and that a beginning of the world is therefore a necessary condition of the world's existence. [B 454; N. K. Smith trans.]

In the first sentence of the above argument, Kant uses a realistic formulation according to which one could make sense, on the hypothesis considered, of what is meant by "the given moment," "an eternity [infinite number of moments] elapsing," and "successive states of things," only to the extent that these are correlated with the instants of absolute time that flows on equably and objectively. Although he does not explicitly make reference to the Newtonian view of the matter, it is clear nevertheless that it is some such view that he has in mind. In the very next sentence, however, Kant abandons reference to "moments," or "successive states of things," and falls back into the subjectivistic mode of language more ap-

propriate to his own idealistic philosophy. By this means he claims the right to characterize infinity as that which can not be "completed by a successive synthesis," as thereby somehow dependent upon the mind's capacities or incapacities. The wholly unwarranted leap from the alleged conditions of mental fatigue to what must characterize the world itself, is what Kant performs in the conclusion to this "argument."

A more consistently objective while none the less still absolutistic conception of space and time is employed by Kant in the proofs of the antithesis. There he argues against the view that the world could be said to have a beginning in time or a limit to its space by claiming that such a position involves an inability to make intelligible the relation of such a world to the "empty" time which preceded it or to the "empty" space which would surround it. With respect to the first part, that relating to time, he argues:

> For let us assume that it has a beginning. Since the beginning is an existence which is preceded by a time in which the thing is not, there must have been a preceding time in which the world was not, i.e., an empty time. Now no coming to be of a thing is possible in an empty time, because no part of such a time possesses, as compared with any other, a distinguishing condition of existence rather than of non-existence; and this applies whether the thing is supposed to arise of itself or through some other cause. In the world many series of things can, indeed, begin; but the world itself cannot have a beginning, and is therefore infinite in respect of past time. [B 455.]

Similarly with respect to space he argues:

> As regards the second point, let us start by assuming the opposite, namely, that the world in space is finite and limited, and consequently exists in an empty space which is unlimited. Things will therefore not only be related *in space* but also related *to space*. Now since the world is an absolute whole beyond which there is no object of intuition, and therefore no correlate with which the world stands in relation, the relation of the world to empty space would be a relation of it to no *object*. But such a relation, and consequently the limitation of the world by empty space, is nothing. The world cannot, therefore, be limited in space; that is, it is infinite in respect of extension. [B 457.]

Now despite the fact that Kant, in a footnote to the latter part of this argument, recasts the whole point in terms once more of his own idealistic epistemology (by speaking of space as "merely the form of outer intuition" and showing how in such terms one can not speak of empty space "outside" of all "appearances") nevertheless the burden of the argument as presented thus far has whatever meaning it has because it makes implicit reference to space and time as constituted, respectively, of an absolute three-dimensional continuum of points which may or may not be occupied by objects, and similarly of an absolute one-dimensional series of instants which

may or may not be occupied by events or processes. Despite its surface similarities, moreover, Kant is *not* here formulating the well-known Leibnizian argument for the relational character of space and time. On the contrary, Kant is saying, as I understand it, that although empty space is to be conceived as made up of an infinite number of points and time of an infinite number of instants, there could be no way in which, if we take the world as physical and compacted of objects and events, we could make intelligible why such a world should begin at some arbitrary instant of the time-series or occupy a particular, arbitrary position in the void. The only way of escape from this state of unintelligibility, the argument urges, is to assert that the infinite space continuum and time-series are filled by the world, or, turning it around, that the world has neither a beginning in time nor a limit in space. Once more, therefore, the strength of the argument rests upon the conception of space and time as absolute.

Finally, Kant adopts at the other extreme a more straightforward subjectivist, epistemological approach in the proof of the second half of the thesis as well, of course, as in his own solution to the whole problem posed by the antinomy. In the former case, he undertakes to show that the world can not be said to be infinite in space on the ground that this would involve the necessity of the mind's traversal of such an infinite series, something which he declares is clearly impossible. He writes:

> As regards the second point [the thesis that the world is limited as regards space], let us again assume the opposite, namely, that the world is an infinite given whole of coexisting things. Now the magnitude of a quantum which is not given in intuition as within certain limits, can be thought only through the synthesis of its parts, and the totality of such a quantum only through a synthesis that is brought to completion through repeated addition of unit to unit. In order, therefore, to think, as a whole, the world which fills all spaces, the successive synthesis of the parts of an infinite world must be viewed as completed, that is, an infinite time must be viewed as having elapsed in the enumeration of all coexisting things. This, however, is impossible. An infinite aggregate of actual things cannot therefore be viewed as a given whole, nor consequently as simultaneously given. The world is, therefore, as regards extension in space, not infinite, but is enclosed within limits. [B 456.]

The way in which, in Kant's eyes, the whole difficulty posed by the antinomy is to be avoided, is similarly "solved" in terms that relate to the manner in which we are to conceive of the mind's employment. The critical solution bids us, therefore, abandon any hope of identifying the series into which we cast our representations of the spatial and temporal features of the world, as either finite or infinite. Kant maintains himself, indeed, in terms reminiscent of the proof of the antithesis, that one could never uphold the claim

that such series are finite, since, according to him, one could have "no experience of an absolute limit." The only alternatives, therefore, are to think of the spatio-temporal series as either infinite or indefinite. For Kant, however, the conception of an absolutely infinite series is as illegitimate as that of an absolutely finite one. One could not have any possible experience of an absolute infinite. The sole remaining possibility, therefore, and the one selected, is to make the regress an indeterminately continued one.

> Since the world is not given me, in its totality, through any intuition, neither is its magnitude given me prior to the regress. We cannot, therefore, say anything at all in regard to the magnitude of the world, not even that there is in it a regress *in infinitum*. All that we can do is to seek for the concept of its magnitude according to the rule which determines the empirical regress in it. This rule says no more than that, however far we may have attained in the series of empirical conditions, we should never assume an absolute limit, but should subordinate every appearance, as conditioned, to another as its condition, and that we must advance to this condition. This is the *regressus in indefinitum*, which, as it determines no magnitude in the object, is clearly enough distinguishable from *regressus in infinitum*. [B 548.]

When we turn from the above summary of the Kantian views of the space-time problems of cosmology to the broad arena of present-day scientific discussions, a number of significant points of contrast present themselves. Effective criticism of the Kantian view from the vantage point of modern science, that would reflect the latter's progress in content as well as its increasing methodological self-understanding, would point out those respects in which Kant's claims fall short partly because of their limitation to a by-now outdated physical theory or insufficient mathematical comprehension, partly because of their inadequacy when considered from the side of the theory of method.

(1) Advances in physics and mathematics have brought with them fresh perspectives and insights, according to which many of the orthodoxies of traditional thought have had to be surrendered or transformed. A crucial instance of this, of course, has been the change in outlook with regard to Newtonian conceptions of physics, some of whose basic presuppositions we found at work in Kant's own thought. The absolute theory of space and time has long since succumbed to a relational and more recently to a relativistic one. Whatever be the ultimate outcome of the application of relativistic ideas to cosmology, and quite apart, too, from internal criticism and development of relativity theory itself, one thing seems clear. There can never be a return to a conception of space and time which would treat them as wholly independent of physical entities and processes. Logical criticism as well as physical experiment have revealed beyond any significant doubt the adjectival and

relational character of space-time measures. One can no longer overlook the way in which specific bodies and events are employed as frames of reference or as standards by which both temporal and spatial locations and extensions are determined.

Contemporary approaches to physical and, in particular, cosmological problems are aware of the multiplicity of ordering devices of spatial and temporal continua of a scope largely unknown to earlier thought. On the side of geometry, the development of non-Euclidean geometries and their availability for use in physical description has the result of no longer confining the choice to the familiar Euclidean pattern. Indeed, since Kant's treatment of space is uniquely in Euclidean terms, one can give a brief and definite answer to the fundamental question which he raises as to whether space is finite or infinite. If physical space is indeed Euclidean then it must, by definition, be infinite. However, the serious questions which confront cosmology at the present time concern which of the geometries that are available is to be used to describe most adequately the spatial metric of the universe as a whole. It is known that there are three and only three basic metric geometries that satisfy the demand of the axiom of congruence, that is, that the space represented be at once homogeneous and isotropic. Each of these geometries is identified by a particular type of constant curvature. The Euclidean (parabolic) type is characterized by zero curvature; in it straight lines are infinite. The Lobachevsky-Bolyai (hyperbolic) type possesses negative curvature; in it straight lines are likewise infinite. The Riemannian (elliptic) type has a positive curvature and in it straight lines are finite yet boundless. Present-day cosmologies unite in making the common assumption that on the grand scale the spatial structure of the universe as a whole is of uniform character. It will, if such an assumption is correct, exhibit one of the three basic metrical geometries. All efforts, therefore, at the present time are bent on discovering those particular clues which will enable a choice to be made. In some models of the universe, indeed, the universe is pictured as having a closed, Riemannian type of geometry and therefore as having a finite volume. In any case, Kant's assumption that space is inevitably Euclidean, and the consequent problems raised in connection with the "series" built on this basis, whether or how it is to be "terminated," now appear as highly irrelevant and misleading.

Similarly, the problems confronting the adoption of a "time-metric," as treated in contemporary discussions, take on a far more complicated character than anything suspected by Kant. Attention has come to be focussed on the manner in which judgments

of temporal "positions" and durations are intimately bound up with choices of moving frames of reference, with particular physical processes taken as standards (velocity of light, nebular recession, radioactive decay, etc.) and with alternative methods of clock-graduation. No longer can one make the simple assumption that the "time-series" is given to us in such a unique and intuitively clear way that attention is left free to settle the problem whether the series has a beginning or not. Until questions of time-measurement, in some ways analogous to those of space, have been clarified, it is futile to indulge in either the antinomial bickerings that Kant portrays or to take refuge in his own equally insufficient solution.

Especially suspect, therefore, becomes the manner in which Kant introduces the time-series as essential to the very formulation of all cosmological problems. For him, not only the natural and legitimate questions concerning the order of succession of events, but the description of the world in spatial terms, the question of its material divisibility, as well as the nature of its causal connections, involve essentially the serial arrangement provided by the experience of time. The drive to understand any item of experience identified and regarded as a "conditioned" becomes, in this generalized mode of time-like description, a search for the antecedent "conditions," the terms preceding it in the series, upon which it depends and from which it arises. Out of this "serialization" of experience arises, according to Kant, the characteristic ambition of Reason. This consists not simply in tracing the sequence of terms in a "regressive" manner, that is, from the given "conditioned" to the antecedent conditions, but in attempting to grasp the series as a whole, in reaching, in some way, that which is "absolutely unconditioned." Leaving aside here the question of the fruitfulness of this method of formulation with respect to the problems of material divisibility and causal connection, it may be remarked that at least with respect to the problem of determining the spatial character of the universe, the way in which Kant undertook to express the matter is largely abortive. For the treatment whereby he undertakes to show the dependency of space-measurements on time, is a wholly psychologistic one. "The synthesis of the manifold parts of space," he writes, "by means of which we apprehend space, is successive, taking place in time and containing a series" [B 439]. To this, the obvious reply must be that the problem of determining spatial metrics of any continuum is independent of the successive acts of apprehension of some mind. Of a more fruitful character than such psychological irrelevancies are the kind of considerations provided, for

example, by relativity theory which has brought home the way in which spatial measurements are, from one point of view, dependent upon the state of motion of the chosen frame of reference, and, from another, upon the distribution of masses (Mach's principle). Even where, as in a theory such as Milne's, one comes perhaps closest to a Kantian type of approach, by taking the experienced identification of successive events at the observer as the given and irreducible materials out of which higher constructs are built, there is an important difference to be noted. The choice from among the various geometries to be used is associated with wholly objective methods of clock-graduation. Space is not transformed into a series of increasing "limits" to be traversed by the mind in search for some possible absolute limit.

(2) The formulation of cosmological problems in terms of time-like serializations leads Kant to the making of a number of characteristic demands and proposals that are avoided in contemporary scientific approaches. One of these relates to the conception of totality itself. For Kant, the attempt to deal with the notion of totality, in his sense of an "absolutely unconditioned totality," is scientifically unwarranted because it becomes equivalent to the attempt to deal with a completed synthesis. This, he maintains, involves an illegitimate extension of a concept of the understanding. An unconditioned totality or completed synthesis is incapable of being experienced in any way, while to come within the range of actual or possible experience is a *sine qua non* of understanding. Such unwarranted use of the notion of totality would be present in either of two possible forms: where the series has an absolutely first term, and where the series itself as a whole, without any first term, is taken as unconditioned. These positions are adopted, respectively, by those who assert that the world has a beginning in space and time and by those who affirm its infinity. In the first case, it would be impossible to experience an absolutely first term. "Such an experience would have to contain a limitation of appearances by nothing, or by the void, and in the continued regress we should have to be able to encounter this limitation in a perception, which is impossible" [B 545]. On the other hand, the claim that the universe is infinite is equally unwarranted, since it is impossible to complete in experience, by means of a successive synthesis, an infinite series.

The way in which in contemporary cosmology the above difficulties as well as the necessity for recourse to the Kantian solution are all avoided, is accomplished, primarily, by a reformulation of the meaning of totality itself. In place of a *concept* of totality as

based on the form of a *series* one finds the introduction of a *theory* that deals with the universe as a *physical system.*

To have a theory in cosmology means, as in any other branch of science, to bring to bear some pattern of ideas as explicated and related in some set of fundamental principles, generally expressible in mathematical form, from which by logical processes one is able to deduce systematically, and thus explain, already observationally-established facts or laws and to predict, and thus to extend the range of further observable facts. In the case of cosmology at the present time, such theoretical ventures take the form of construction of "models" of the universe as a whole, i.e., idealized conceptual representations of the structure of the universe in which, guided by observational clues, the elements of such a model are constituted of the extra-galactic nebulae identified by our large telescopes. In the construction of such models application is made of the basic ideas of relativity theory in its various forms. These in turn invoke fundamental ideas primarily from the domain of mechanics. To treat the universe as a whole as a physical system, therefore, involves fundamentally the same methodological apparatus as in any other branch of physical science. The scale is vaster, but the basic rules are the same.

The use and relevance of physical theory to cosmology brings to light another point of contrast with the Kantian discussion. For Kant the test of cognitive adequacy of a concept is the extent to which it can be exhibited in intuition or sense-experience. On the ground that one could not hope to have any sense-experience of the totality of the space-time series, it is regarded as transcendent and therefore metaphysical [B 511–512]. But this is to take a narrow and unduly cramped view of the relation between interpretative and factual elements in scientific knowledge. It is not necessary that one have a sense-experience of the universe as a whole, provided some theory as to the structure of this totality leads by way of prediction to the observation of particular aspects and features of this totality in a way which is open to confirmation. No more than this type of relation to sense-experience actually is demanded of scientific theories in *any* domain.

(3) Once we can free ourselves in a scientific cosmology from the incubus of a formal and serial treatment that Kant laid upon all investigations into the universe as a whole, another of his central teachings as it bears on this topic loses much of its significance, this time the distinction between the regulative and constitutive uses of Reason.

For Kant the sole legitimate function of Reason is to prescribe the rule for the indefinitely continued search in the regressive

syntheses performed by the understanding for further and still further terms in the spatial and temporal series in which the phenomenal character of the world is represented. Instead of pretending through a fallacious, because transcendent, leap to identify constitutively the world as it is in itself as an absolutely unconditioned totality, all that responsible inquiry can do is set as a problem the search for further terms in the series itself. It must never assume at any given stage in its "synthesis" that it has reached an absolute limit. The account which Kant himself gives of the above doctrine reveals varying emphases in the several layers of composition of the *Critique*. At times the emphasis is a methodological one, at other times an ontological one. In the former case, Kant brings to the fore the manner in which the rightful function of Reason is to be taken as a kind of critical extension and guide for understanding. It would keep it from performing premature or incomplete syntheses; it provides an ever-receding goal that, like the carrot before the donkey, serves to keep it in motion. The illegitimate, constitutive ambition of Reason would consist in taking as an axiom rather than as a problem some positive account of the series as a completed totality, and as, therefore, actually finite or infinite. In the ontological vein, the distinction between the regulative and constitutive uses of Reason is correlated with that between the two orders of being, the phenomenal and the noumenal. The former provides the domain for scientific exploration but is condemned to be incomplete; the latter, while cognitively inaccessible, is nevertheless taken as "ultimate" reality. Though we can not have any constitutive knowledge of this hidden world, Reason nevertheless enforces upon (scientific) understanding an awareness of its phenomenal and essentially limited character.

What effect does the recognition of cosmology as a science have upon this doctrine? We may begin with the question of the "reality" of knowledge, of the adequacy of the science of cosmology to give us insight into the structure of the "real" world. This is not the occasion on which to undertake to develop in any detail an epistemological alternative to Kant's transcendental idealism or phenomenalistic agnosticism. It is sufficient to note that in so far as cosmology employs the method of science, it may not be any better off, but it is surely not any worse off than any other science in giving us reliable knowledge of the "real" world. The difficulties that confront it belong to the order of technical limitations, complexity of factors to be taken into account, and relative paucity of observational data, rather than a complete inaccessibility or imperviousness to scientific treatment. Also, it may be well to re-

member, "reality" for science consists not of some hidden noumenal realm but of that domain of facts and laws about which universal agreement can be reached through the use of a self-corrective, public method. Similarly "appearance" is to be identified, not with some ineluctable screen of humanly generated forms and interpretations behind which the mind is forever condemned to operate. The functional equivalent in scientific method of a world of appearance will be taken rather by those descriptions which, either because of their uniquely personal and private character, or because of their insufficiently developed form (not exhibiting the measurable constancy or invariable association characteristic of well-established generalizations), do not justify their being given the status of objective and accredited facts within the body of science.

Once we accept the view that confirmed scientific theories and the laws which they serve to explain provide the means whereby the subject-matter upon which they are directed becomes intelligible, the application of this view to cosmology admits the sense in which its established results may be taken as constitutive. For Kant, "totality" was never to be reached as a matter of principle. For cosmology as a science, "totality" is present in principle in every theory that properly belongs to it, since it is the very business of cosmology to undertake to give some account of the universe as a whole. It is not the case that totality is forever beyond its reach; on the contrary, it is always within the range of its formulations. To the extent, therefore, that a particular cosmologic theory continues to function adequately, we are justified in regarding the structure which it articulates as *constituting* the intelligible pattern of the universe as a whole.

At the same time ordinary scientific caution enforces the recognition of the tentative and incomplete character of *any* theoretical results or descriptive generalizations however well-established these may be. In this sense we can recognize a "regulative" function present in scientific inquiry. It becomes, however, in cosmology as much as in any other branch of inquiry, simply the reminder that no theory can claim for itself absolute certainty, simplicity, and systematic power. These become regulative standards which govern the evaluation of the results of science at any given stage. This means in effect that we must abandon the regulative use of the Idea of totality as Kant interpreted it and as it applied exclusively to cosmology. Instead only such "regulative" standards govern cosmology as do all other sciences.

We have here, too, the clue to answering the question whether even on a scientific basis, fresh antinomies might not develop which would preclude settlement of rivalry among several different

theories. The answer must clearly be in the negative. The conflict among scientific theories is not of an antinomial character. The differences among several "models" of the universe in cosmology are to be regarded as exhibiting the familiar grounds of conflict among competing accounts that are possessed of varying degrees of success with respect to comprehending a common subject-matter.

The temper in which the arguments presented by Kant in behalf of the opposing positions in the antinomy as well as that present in his own "solution" expresses a quality of supposedly permanent validity for the considerations offered. They would each of them want to uphold their respective claims in complete independence of all changes in empirical evidence or mathematical comprehension. Actually, for all their avowed universal and necessary character, all such arguments at some point reflect, though unconsciously to their authors, evidence accepted at a given period either because of its supposedly common-sense character, or because it rests upon some mathematical conception or scientific theory themselves thought to be unexceptional. In the case of an explicitly avowed scientific approach, however, there is a clear sensitivity to the demands of the relatively fluid character of the evidence, observational and mathematical, upon which theory depends for its support. For cosmology as a science, this means at once that the whole level of discussion must be removed from the sphere of *a priori* metaphysical or epistemological solutions to the progressive and constructive field of research.

The foregoing interpretation, finally, shows us that we may substitute for the Kantian absolute and unbridgeable gulf between two orders of being a distinction of degree within the same context of progressive inquiry. This is to be found in the relative adequacy of explanation provided by different models of the universe. However, such an interpretation is not to be confused with the idealist transformation of the Kantian position. For while, generally speaking, the idealist abandonment of ontological dualism is sound enough, it is replaced by a metaphysical monism which is equally suspect. For reality as posited by idealism becomes at best a hypostatized ideal of human effort transformed into an antecedent existent. Reality becomes, among other things, the complete system of truth within which every item of fact finds its adequate and full explanation. Such a view commits in its own way the very same type of pathetic fallacy as the most primitive animism. It fails to distinguish what belongs to the activities of the mind and to the field of objects within which and upon which it is directed. To identify ideals for science, just as for any other mode of experience,

means precisely to recognize them as unattained goals, imaginatively projected standards which serve to encourage ongoing activity in its struggle to remove imperfections and as criteria for estimation of the results achieved. It does not mean that such ideals are in some metaphysical way already realized, that men must strive to approximate in some degree to the perfect insight which some Infinite Mind possesses from all eternity. The goals of cosmology are goals of human beings. Through the measure in which they are reached, the universe becomes understood, perhaps for the first time anywhere throughout its vast stretches in space and time.

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COMMENTS AND CRITICISM

NOTES ON LEMAÎTRE'S COSMOGONY

Canon Georges Lemaître, in his book *The Primeval Atom* (Van Nostrand, 1950), has submitted a hypothesis on the origin of the universe which has certain important metaphysical conceptions more or less implicit within its structure.

As a Catholic, Canon Lemaître may be expected to offer a cosmological hypothesis that would satisfy, at least implicitly, certain basic theological and metaphysical doctrines. Even a most casual reading of his very interesting and scientifically valuable and original work confirms this expectation, though his discussion throughout is quite scientific in presentation. It is his specific epistemological criteria which I wish to examine more carefully.

First, however, we must submit a brief outline of his cosmogony. As early as 1927, Lemaître postulated an expanding universe of finite (increasing) radius of "hypercurvature" (R) and with a finite positive cosmological constant (λ), the latter accounting for expansion through its effect of "cosmic repulsion" between the nebulae. Using Friedmann's modification of Einstein's equations of general relativity, Lemaître's analysis shows us a universe which, some two billion years ago, was contracted into a highly concentrated state of matter or energy—the "primeval atom"— a single hyperspherical unit of enormous density. This "atom" underwent explosive "radio-active decomposition" giving rise to the cosmic rays, atomic particles, etc., some of which eventually arranged themselves under mutual gravitation into the nebulae, stars, and planets of our ever expanding universe. The entropy of this finite universe is always increasing toward an "ultimate heat death"; thus there is

an average increase in the number of photons, each averaging a smaller frequency and energy than before.

It is clear from this picture of the universe that some sort of "beginning" and "end" of cosmic history might be indicated, and the doors to various theologies are therewith opened by those who care to open them. As pointed out in the preface of his book (pp. 13–16), it took Lemaître's peculiar ingenuity to resolve the Kantian antinomy on time. Lemaître's solution utilizes a form of operationalism, along with a definition of time conformable to Aristotle's "time" as the "number [measure] of motion." At that stage of the universe when it was, by Lemaître's hypothesis, a single material unit, there was not yet any "clock" or "time," since there were not yet any relatively moving parts. Hence, no operation is conceived whereby time can be defined or measured, and therefore there is no scientific meaning (operationally) in asking: "What was the state of the universe *before* some two billion years ago?" Lemaître apparently interprets this to mean that the universe did not exist before this date, since there is no operational meaning to "before."

The major methodological emphasis implicit in Lemaître's cosmogony is some form of operationalism. It becomes apparent not only in the above discussion on cosmic time, but also in a peculiar insistence on his part with respect to the hypercurvature of three-dimensional space. Regarding an equation for a hypersphere involving *four* Cartesian coördinates of space (*op. cit.*, p. 172), he insists very strongly *against* interpreting this equation as implying the "physical existence of some kind of fourth spatial dimension," and declares that "It is nothing other than a mathematical device. . . ." Apparently, for Lemaître, the radius of hypercurvature (R) is defined in terms of the conceptual operation in which one travels in one direction on a three-dimensional geodesic (a straight line in 3-space), returning (by hypothesis) to one's starting point. Then $R = C/2\pi$, where C is the postulated finite distance of the entire trip. (R is here defined on the assumption of a "spherical" geometry. An "elliptical" geometry takes $R = C/\pi$.)

If one were a "strict operationalist," one could argue from the foregoing that any four-dimensional hyperspace has no "physical meaning"— the complete meaning of R would simply be indirectly derived from the *operation* defining C. It is, however, interesting to speculate on Lemaître's motivations for being so insistent upon such a strict operationalistic interpretation of R. If the universe were conceived to be expanding into a "physically real" hyperspace (fourth spatial Euclidean dimension), such a conception would immediately open the door once again to the possibility of an infinity

of space and of an infinity of other material universes likewise undergoing expansions into this infinite Euclidean hyperspace—with possible "collisions" in such space. Therewith, the whole force of Lemaître's argument for a "beginning" and for a "heat death" of the universe would be essentially lost, or at least very much weakened.

It is worth noting on this point that Einstein also goes out of his way to dismiss "a fourth space dimension" as merely "a mathematical artifice" (*The Meaning of Relativity,* 3rd ed., footnote on p. 104), even though he can accept as possible a positive finite value to R. Richard Tolman (*Relativity, Thermodynamics and Cosmology,* pp. 370–371), on the other hand, does not seem to feel obliged to object explicitly or otherwise to the "physical reality" of a fourth spatial dimension. For my own part, I will simply remark that "operationalism" is of various degrees, and that in most cases an "operation" used in defining some concept in physics has with it a *theory of measurement* in terms of which that operation is said to be carried out "correctly." Thus, the operation which defines a length in terms of laying out a measuring rod in a certain specified manner requires a *theory* in terms of which it is said to be a "good" or "correct" measuring device and procedure. Whether, therefore, one should define R as $C/2\pi$ depends upon a *theory* (geometrical) in terms of which the concepts of C and R are formulated, as well as upon the empirical operations involved in obtaining a definite value for C. To dismiss these theories of measurement as merely a "mathematical artifice or device" and to give "physical reality" *only* to the empirical operations, is to carry empiricism to rather extreme lengths, and to indulge in arbitrary verbalism, an extreme nominalism, and a metaphysics hardly called for in the philosophy of scientific thinking.

In concluding our remarks upon Lemaître's hypothesis, it might be well to emphasize that his particular cosmogony is but one among many possible dynamic cosmological models (including some for which R is infinite and λ is zero) so ably analyzed by Richard Tolman (*op. cit.*). Tolman (*op. cit.,* p. 412) remarks on Lemaître's hypothetical model that Lemaître "has picturesquely described the original singular state as that of a giant atom." Both Tolman and Einstein are well aware of the dangers of applying the field equations of general relativity to very dense (singular) states of matter (energy)—such as may be supposed to have existed in a previous stage of an expanding universe. Highly dense energy states require an appeal to nuclear theory in physics—and no such theory is, as yet, scientifically adequate. Once such a theory becomes available (either as a unified field theory, a nuclear quantum theory, or what

not), we might very well obtain a new theory of measurement in terms of which times prior to a presumed universal condensed state ending about two billion years ago could be given a physical meaning!

Elsewhere (this JOURNAL, Vol. XLII, 1945, p. 545) I have tried to deal with other aspects of cosmogony, but here I will conclude with a quotation from Tolman (*op. cit.*, p. 488) which seems to me to be most appropriate:

> It is evident that the past history of the universe and the future fate of man are involved in the issue of our studies. Hence we must be specially careful to keep our judgments uninfected by the demands of theology and unswerved by human hopes and fears. The discovery of models, which start expansion from a singular state of zero volume, must not be confused with a proof that the actual universe was created at a finite time in the past. And the discovery of models, which could expand and contract irreversibly without ever coming to a final state of maximum entropy and rest, must not be confused with a proof that the actual universe will always provide a stage for the future role of man.
>
> It is appropriate to approach the problems of cosmology with feelings of respect for their importance, of awe for their vastness, and exultation for the temerity of the human mind in attempting to solve them. They must be treated, however, by the detailed, critical, and dispassionate methods of the scientist.

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BOOK NOTES

The Spirit of Western Philosophy. An Historical Interpretation Including Selections from the Major European Philosophers. NEWTON P. STALLKNECHT and ROBERT S. BRUMBAUGH. New York: Longmans, Green and Co. 1950. xxi + 540 pp. $4.75.

I assume that this book will in due time have adequate reviews. Meanwhile, I should like to give my impression of it.

I take pleasure in the straight-forward virile English prose. There is no learned jargon to impress and bewilder. Everywhere there is the essential virtue of clear statement.

A history of philosophy must deal with the wars of the philosophers. How those wars may affect an under-graduate and many another came to my notice long ago when a Cornell student told me that he was first fascinated and then bewildered as he heard Dr. Schuman in one brilliant lecture after another on the philosophers who do not agree. At last the student said: "Tell me which of these is true or I shall go mad." Dr. Schuman said, not unkindly: "I suggest you drop this course."

The authors of this book meet these problems head-on. First they meet them as Schuman did, with erudition based on sound

study of the texts. Then in dealing with each philosopher they have ever in mind Herbart's two imperatives for one who would judge a man. First be as if his disciple. Then judge.

Overlooking the history of Western philosophy as a whole, the authors do not see in it an inevitable forward march as if beginning in Thales and ending in Hegel. But when I read the story as they tell it I am led to see it as one story—as the history of religions and the history of works of art—each through all the diversities is in its own way essentially one. There is in each of these stories much that does drive some to madness. But many more find ways of preserving their sanity in the midst of confusions.

One way to sanity that I discern in this book is recognition that any and every philosophy is a partial revelation of what is in man —as he feels his way driven by irrepressible urge to find meanings and if possible the meaning of himself and of the universe in which he is immersed.

I take pleasure in the frequent citations from the poets. The most learned work on the philosophers is the better if the writer is at home with the poets.

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INDIANA UNIVERSITY

The Foundations of Arithmetic. A *Logico-mathematical Enquiry into the Concept of Number.* GOTTLOB FREGE. English translation by J. L. Austin of *Die Grundlagen der Arithmetik* printed together with the German text (Breslau, 1884). New York: Philosophical Library. 1950. xii + xii* + XI + XI* + 119 + 119* pp. $4.75.

This is an admirable translation of Frege's famous but neglected work, and is a contribution to the growing Frege renaissance we have been witnessing during the past few years. The book continues to be eminently worth reading, for while the state of logical studies has been transformed since its first publication the issues with which Frege deals have by no means been definitely settled. His discussion of the formalist theory of mathematics is of special current relevance and interest, and his critique of that theory (though not as fully developed in the present book as in the second volume of the *Grundgesetze der Arithmetik*, parts of which are now also appearing in translation in *The Philosophical Review*) exhibits Frege's philosophic acumen at some of its best as well as at its weakest. But whether his analyses are judged to be conclusive or not, the philosophically stimulating quality of the book is beyond question.

E. N.

NEW BOOKS AND CURRENT JOURNALS

Aristotle from Natural Science, The Metaphysics, Zoology, Psychology, The Nichomachean Ethics, On Statecraft, The Art of Poetry. Selected and translated from the original Greek into the English of today by Philip Wheelwright. Augmented and revised edition. New York: The Odyssey Press. 1951. xlviii + 336 pp.

Vito A. Bellezza: Giovanni Gentile. La vita e il pensiero. A cura della Fondazione Giovanni Gentile per gli studi filosofici. Vol. III. Bibliografia degli Scritti di Giovanni Gentile. Firenze: G. C. Sansoni. 1950. 141 pp. 2000 L.

Hadley Cantril: The "Why" of Man's Experience. New York: The Macmillan Company. 1950. xi + 198 pp. $3.00.

C. H. De Goeje: Space, Time and Life. Leiden: E. J. Brill. 1951. 64 pp.

Paul Blanshard: Communism, Democracy, and Catholic Power. Boston: The Beacon Press. 1951. x + 340 pp. $3.50.

Stéphane Lupasco: Le principe d'antagonisme et la logique de l'énergie. (Prolégomènes à une science de la contradiction.) (Actualités Scientifiques et Industrielles, 1133.) Paris: Hermann & Cie. 1941. 137 pp.

Gabriel Marcel: Being and Having. A Translation by Katharine Farrer of *Etre et Avoir*. Boston: The Beacon Press. 1951. (First English Edition, Dacre Press, 1949. Reviewed by Robert Cumming, Vol. XLVIII, No. 3.) 240 pp. $2.25.

F. DeWolfe Miller: Christopher Pearse Cranch and his Caricatures of New England Transcendentalism. Cambridge, Mass.: Harvard University Press. 1951. xi + 81 pp. $2.00.

Enzo Paci: Studi di filosofia antica e moderna. (Biblioteca di Filosofia e Pedagogia.) Torino: G. B. Paravia & C. 1951. 248 pp.

Richard Robinson: Definition. Oxford: At the Clarendon Press. New York: Oxford University Press. 1950. viii + 207 pp. $3.00.

Ramon Diaz Sanchez: Guzman. Elipse de una ambicon de podeo. Caracas, Venezuela: Ediciones del Ministerio de Educación Nacional. 1950. 613 pp.

Herbert Spencer: Literary Style and Music. Including Two Short Essays on Gracefulness and Beauty. New York: Philosophical Library. 1951. x + 119 pp.

Patrick Gordon Walker: Restatement of Liberty. London: Hutchinson & Co., Ltd. 1951. x + 429 pp. 21s.

Hermann Wein: Das Problem des Relativismus. Berlin: Walter de Gruyter & Co. 1950. 126 pp.

Heinrich F. Wolf: Philosophy for the Common Man. New York: Philosophical Library. 1951. xxxii + 189 pp. $3.50.

MIND. Vol. LX. No. 238. Our Direct Experience of Time: *J. D. Mabbott.* On Concept and Object: *Gottlob Frege.* Translation: *P. T. Geach.* Decisions and Descriptions: *K. Baier.* Ethical Disagreements and Emotive Theory of Values: *V. Tomas.* Ordinary Language and Procrustean Beds: *C. D. Rollins.* The Emotive Theory and Relational Methods in Moral Controversy: *A. Moore.* Discussions—What Achilles said to the Tortoise: *W. J. Rees.* A Supposed Contradiction in *Le Contrat Social: D. Verney.* Referring Uses and Self-enforcing Directives: *R. Buck.* The Immortality of the Soul: *N. A. Nikam.* A Note on "Meeting": *D. Cox.* Note on the Exhibition of Logical Machines at the Joint Session, July 1950: *W. Mays, C. E. Hansel, D. P. Henry.*

PHILOSOPHICAL STUDIES. Volume II, Number 3. Mr. Mayo on "Rules" of Language: *Vaclav Edvard Benes.* A Theory of Proper Names: *A. W. Burks.* Reichenbach on Observing and Perceiving: *R. M. Chisholm.*

ANALYSIS. Vol. 11, No. 4. Equivocal Confirmation: *Rupert Crawshay-Williams.* Tense Usage and Propositions: *Jonathan Cohen.* Amending the Verification Principle: *Robert Brown* and *John Watling.*

JOURNAL OF SYMBOLIC LOGIC. A theorem about infinite-valued sentential logic: *Robert McNaughton.* On sentences which are true of direct unions of algebras: *Alfred Horn.* Axiom schemes for m-valued functional calculi of first order. Part II: *J. B. Rosser* and *A. R. Turquette.* Report on some investigations concerning the consistency of the axiom of reducibility: *John Myhill.* On the independence of Henkin's axioms for fragments of the propositional calculus: *Maurice L'Abbé.*

NOTES AND NEWS

The Joint Session of the Aristotelian Society and the Mind Association will meet July 6–8, 1951, at Edinburgh University. The program will include the following papers and symposia: "Concerning the History of Philosophy" by J. MacMurray; Symposium on "Thinking and Language," Iris Murdoch, A. C. Lloyd, Gilbert Ryle; Symposium on "The Logical Status of Supposition," David Pears, A. H. Basson, B. Mayo; Symposium "On What There Is," P. T. Geach, A. J. Ayer, W. V. Quine; Symposium on "The Freedom of the Will," Stuart Hampshire, W. G. Maclagan, R. M. Hare.